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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/579,466	05/26/2000	Koichi Sato	P19105	7486

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EXAMINER

GENCO, BRIAN C

ART UNIT	PAPER NUMBER
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2615

DATE MAILED: 03/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/579,466

Applicant(s)

SATO, KOICHI

Examiner

Brian C Genco

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/9/04
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 3-6 and 8-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3-6, and 8-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 12, 2004 has been entered.

Applicant's amendment filed December 9, 2004 has overcome the grounds of rejection previously presented. As such, new grounds of rejection are presented herein below.

Drawings

Figure 3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance. Examiner notes that Fig. 3 is clearly an illustration of the prior art full frame transfer type CCD described by Applicant on page 1, line 10 – page 2, line 5.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 is dependent on canceled claim 2. For the purpose of Examination claim 3 will be treated as being dependant on claim 1. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 3-5 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over (Applicants Admitted Prior Art, herein AAPA) in view of (USPN 4,679,212 to Hynecek) in further view of (USPN 5,339,162 to Tani).

In regards to claim 1 AAPA discloses a full frame transfer type imaging device, comprising:

the full frame transfer type imaging device having a light receiving element provided with first and second electrodes, the light receiving element and vertical transfer passage being provided in common in said full frame transfer type imaging device (e.g., page 1, line 10 – page 2, line 5, wherein the disclosed plurality of electrodes comprises at least a first and second electrode).

AAPA does not disclose an accumulating period calculating processor that obtains an accumulating period of said full frame transfer type imaging device, a voltage control processor that controls voltage levels of said first and second electrodes during said accumulating period, said voltage control processor fixing a voltage level of said first electrode and periodically changing a voltage level of said second electrode, in accordance with a length of said accumulating period, so that a charge pumping operation is performed, wherein said voltage control processor shortens a period by which said voltage level of said second electrode is periodically changed as said accumulating period increases.

Hynecek discloses an apparatus for driving an imaging device, comprising:

a voltage control processor that controls voltage levels of said first and second electrodes during said accumulating period (e.g., the voltage control processor is implicit in the description on column 14, lines 43-54);

said voltage control processor fixing a voltage level of said first electrode and periodically changing a voltage of said second electrode, in accordance with a length of said accumulating period, so that a charge pumping operation is performed (e.g., as disclosed on column 12, lines 12-42, the switching of said second electrode is done in accordance with a length of said accumulating period, namely that the number of times the switching occurs is limited for a given switching frequency based on the accumulating period).

Hynecek discloses that this voltage control processor can be used with charge transfer devices such as a buried-channel CCD device for providing anti-blooming and other functions utilizing electron-hole recombination (e.g., column 14, lines 11-20 and 51-54). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have

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utilized Hynecek's voltage control processor in the frame transfer imaging device of AAPA so as to provide anti-blooming and other functions utilizing electron-hole recombination.

Hynecek does not explicitly disclose nor preclude an accumulating period calculating processor that obtains an accumulating period of an imaging device. Examiner notes that in equation 8 disclosed on column 12, line 20, the exposure time, or accumulating period, is a variable in determining the overload capacity of the imaging device. Examiner further notes that it is extremely well known to perform photometry to determine ambient lighting conditions so as to enable proper setting of an accumulation period for generating a properly exposed image as taught by Tani in column 1, lines 49-54 and as is generally known to one skilled in the art at the time of the invention. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have added a photometry and control device to Hynecek's invention in order to determine ambient lighting conditions so as to enable proper setting of an accumulation period for generating a properly exposed image.

In regards to the limitation of said voltage control processor shortening a period by which said voltage level of said electrode is periodically changed as said accumulating period increases, Examiner refers Applicant to Fig. 10 and equation 8. Examiner notes that as disclosed in equation 8, as the exposure time increases the number of full well exposures that can be handled increases. Examiner is defining this relationship as the function $E(t,f)$, wherein E is the number of full well exposures that can be handled, t is the accumulation period, and f is the clocking frequency of the second electrode. Examiner further notes that AAPA disclosed on page 2, lines 6-14 that as the temperature or accumulating period increase the amount of noise increases. Examiner is defining this relationship as the function $N(t,T)$ wherein N is the amount of noise, t

is the accumulating period, and T is the temperature. Examiner notes that one skilled in the art at the time of the invention would clearly recognize that upon the function $N(t,T)$ exceeding the function $E(t,f)$ blooming would occur. Due to the direct correlation between the number of full well exposures that can be handled and the clocking frequency of the second electrode illustrated in equation 8, as the number of full well exposures increase the clocking frequency must be increased so as to handle the increased number of full well exposures. As such, based on the relationship shown in Fig. 10 and equation 8 one of ordinary skill in the art would recognize to increase the clocking frequency of the second electrode in order to offset the increased noise.

Examiner notes that since the noise function is dependent on temperature as noted above the same logic could be applied to reject claims 6 and 8 as well, however, in the interest of simplicity this additional rejection will be omitted for now.

In regards to claim 3 note the disclosure of AAPA and see Fig. 17 of Hynecek.

In regards to claim 4 see Examiners notes on the rejection of claim 1. Note that in Fig. 17 of Hynecek the second electrode is toggled.

In regards to claim 5 see Examiners notes on the rejection of claim 1. Note that the Examiner is defining the standard period as the period from the start of the accumulation period to the first switch of said second electrode.

In regards to claims 9-11 see Examiners notes on the rejections above.

Claims 6, 8, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over (Applicants Admitted Prior Art, herein AAPA) in view of (USPN 4,679,212 to Hynecek) in further view of (USPN 5,339,162 to Tani) in further view of (USPN 4,703,442 to Levine).

In regards to claim 6 Examiner notes column 12, lines 12-42. Examiner notes that equation 8 discloses that in a given exposure time period a constant number of full well exposures can be handled at a given second electrode clocking frequency (note Fig. 10; column 9, line 30 – column 10, line 13). Examiner notes that as shown in Fig. 10 the higher the clocking frequency of the second electrode the more full well exposures can be handled. Examiner further notes Fig. 11 and column 10, lines 14-66 wherein it is disclosed that as the temperature increases the number of full well exposures that can be handled decreases. Examiner notes that Hynecek does not explicitly disclose that there is a temperature sensor. Examiner notes that Levine discloses using a temperature sensor for allowing proper correction of dark current in accordance with the temperature (column 2, lines 24-34; column 5, lines 32-37; element 40 of Fig. 1). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have added a temperature sensor to Hynecek's invention in order to allow for proper correction of dark current in accordance with the temperature. Examiner further notes that one skilled in the art would clearly recognize that given the relationships disclosed by Hynecek, in order to handle the same number of full well exposures as the temperatures increases one of ordinary skill in the art at the time of the invention would clearly know to increase the clocking frequency of the second electrode. As such, the standard period as defined above is changed in accordance with the temperature, namely it is decreased as the temperature is increased.

In regards to claim 8 see Examiners notes on the rejection of claim 6. Note that as described in the rejection of claim 6 the period of switching the level of the second electrode is changed in accordance with the temperature, namely decreasing the period for increased temperature.

In regards to claim 12 see Examiner's notes on the rejections above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian C. Genco who can be reached by phone at 571-272-7364 or by fax at 571-273-7364. The examiner can normally be reached on Monday thru Friday 8:30am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Groody can be reached at 571-272-7950. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the customer service office whose telephone number is 571-272-2600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Brian C Genco
Examiner
Art Unit 2615

March 29, 2005


TUAN HO
PRIMARY EXAMINER